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Status of the Northern Pike Population in the Moose River Watershed, Kenai National Wildlife Refuge, Alaska, 1996

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Abstract.— Fyke nets and hook and line gear were used to characterize the distribution and abundance of northern pike *Esox lucius* within the Moose River watershed during April and May 1996. During the ice-covered period (April 1-11), tip-ups baited with herring were fished for 1,844 hours in Watson, Egumen, Peterson, and Kelly lakes. During the ice-free period (April 23-May 31), fyke nets were fished for 2,146 hours in shallow littoral areas of lakes, lake outlets, and low-gradient sections of streams throughout the Moose River watershed. Several fish species were captured with fyke nets including rainbow trout *Oncorhynchus mykiss*, Dolly Varden *Salvelinus malma*, juvenile coho salmon *Oncorhynchus kisutch*, longnose sucker *Catostomus catostomus*, and round whitefish *Prosopium cylindraceum*, however, no northern pike were captured. No fish were captured with baited tip-ups. Recommendations are provided to monitor the projected expansion of northern pike into the Moose River watershed.

Introduction

Northern pike *Esox lucius* are distributed throughout much of Alaska but they are not indigenous to the Kenai Peninsula. This species was illegally introduced into Derk's Lake in the Soldotna Creek watershed during the mid-1970's. From this initial introduction, they rapidly spread throughout the remainder of the Soldotna Creek drainage, including East and West Mackey lakes. From the Soldotna Creek drainage, northern pike have made their way into the Kenai and Moose rivers. Although an occasional northern pike is sport caught in the Kenai River, there is no evidence to indicate that northern pike are reproducing in the mainstem Kenai River (Nelson 1995). Northern pike were first reported in the Moose River during 1986 when a single fish was observed near a fish weir operated above the Kenai National Wildlife Refuge boundary (Booth and Otis 1996). Since then, unpublished information from the Statewide Harvest Survey indicates that anglers are harvesting small numbers of northern pike from in-river lakes on the East Fork of the Moose River (Afonasi, Imeri, Watson, Egumen, Peterson, and Kelly lakes). Successful reproduction of northern pike has not been documented in the Moose River watershed, however, an abundance of

submergent aquatic vegetation found throughout the watershed provides ideal spawning and rearing habitat for this species.

Other than northern pike, the Moose River watershed supports 15 species of fish including four species of Pacific salmon *Oncorhynchus* spp., rainbow trout *O.mykiss*, and Dolly Varden *Salvelinus malma* (U.S. Fish and Wildlife Service 1995). In 1985 and 1986, a weir was installed to determine the timing and escapement of salmon entering the Moose River. A total of 2,228 sockeye *O. nerka*, 1,657 coho *O. kisutch*, 13 pink *O. gorbuscha*, and two chinook *O. tshawytscha* salmon were counted through the weir during 1985 (Booth and Otis 1996). In 1986, a total of 2,918 sockeye, 3,969 coho, and four pink salmon were counted at the weir. The Moose River is also one of the most important rearing areas for coho salmon in the Kenai River watershed. Approximately 22% of the coho smolt leaving the Kenai River watershed from 1992-1994 outmigrated from the Moose River (Carlon and Hasbrouck 1996; Alaska Department of Fish and Game, unpublished data). Resident species such as rainbow trout and Dolly Varden occur throughout the watershed including many headwater lakes. Both species provide popular sport fisheries in several headwater lakes on the Swan Lake Canoe Route and East Fork of the Moose River.

Salmonids and other soft-rayed fishes serve as an important food source for northern pike when they are available. Studies in Russia have indicated that northern pike can be responsible for up to 35% of the mortality of emigrating juvenile salmon (Pervozvanskiy et al. 1988). In the Susitna River watershed, the depletion of coho salmon stocks in several historically productive drainage systems has been attributed to predation by northern pike (Rutz 1996). Studies of northern pike in the Susitna River watershed (Rutz 1996) also revealed that when given the option, northern pike preferred salmonids over other fish species and invertebrates.

The introduction and likely expansion of the northern pike population in the Moose River watershed has generated concern about potential negative impacts on juvenile salmon and resident fish species. To address this concern, the Kenai Fishery Resource Office, in partnership with Kenai River Sportfishing Incorporated, Alaska Department of Fish and Game, and the Kenai National Wildlife Refuge, initiated a stock assessment study for northern pike in the Moose River watershed during 1996. The primary objective of this study during was to characterize the distribution and abundance of northern pike within the Moose River watershed.

Study Area

The Moose River drainage consists of approximately 648 km^2 of lowland habitat on the Kenai Peninsula in Southcentral Alaska (Figure 1). The drainage originates in the Kenai Lowlands north of the Sterling Highway and generally flows in a southwesterly direction before emptying into the Kenai River near Sterling, Alaska. The drainage contains roughly 188 km of streams, 60 named lakes, and over 200 unnamed lakes and ponds (U.S. Fish and Wildlife Service 1995). Approximately 18 named lakes have outlets connecting to the Moose River. Most other lakes are landlocked, however, some may be connected to the Moose River during high water events. Most lakes and streams in the watershed support large beds of submergent aquatic vegetation creating both ideal spawning and rearing habitat for northern pike.

Methods

Sampling for northern pike occurred during two distinct time periods: the late winter ice-covered period (1-12 April) and the early open-water period (23 April-31 May). These time periods were selected for sampling to correspond with periods when northern pike are most active, and therefore, most vulnerable to capture with passive gear (Rutz 1996). During the ice-covered period, tip-ups baited with herring were fished in Watson, Egumen, Peterson, and Kelly lakes (Figure 1). During the open-water period, fyke nets were fished in shallow littoral areas of lakes, lake outlets, and low-gradient sections of streams throughout the Moose River watershed (Figure 1). Two types of fyke nets were used. The standard fyke net fished at all sampling locations measured 1 m in diameter with 25-mm square mesh nylon netting on seven fiberglass hoops. A fyke net with smaller mesh (6 mm knotless nylon mesh) was fished at Watson Lake outlet from 23-26 April. Lead and wing configurations for fyke nets varied depending on the habitat fished. Fyke nets fished in lakes generally had one 15.2-m lead running perpendicular to the shoreline and two 7.6-m wings. Fyke nets fished in stream channels were set with the cod end downstream and were equipped with two 7.6-m wings which attached to each stream bank. Fyke nets and tip-ups were generally fished overnight.

Results

Nearly 4,000 hours of effort were expended with fyke nets and tip-ups in the Moose River watershed during April and May 1996, however, no northern pike were captured. Several fish species were captured with fyke nets including rainbow trout, Dolly Varden, coho salmon (juveniles), longnose sucker, and round whitefish (Table 1). Rainbow trout and

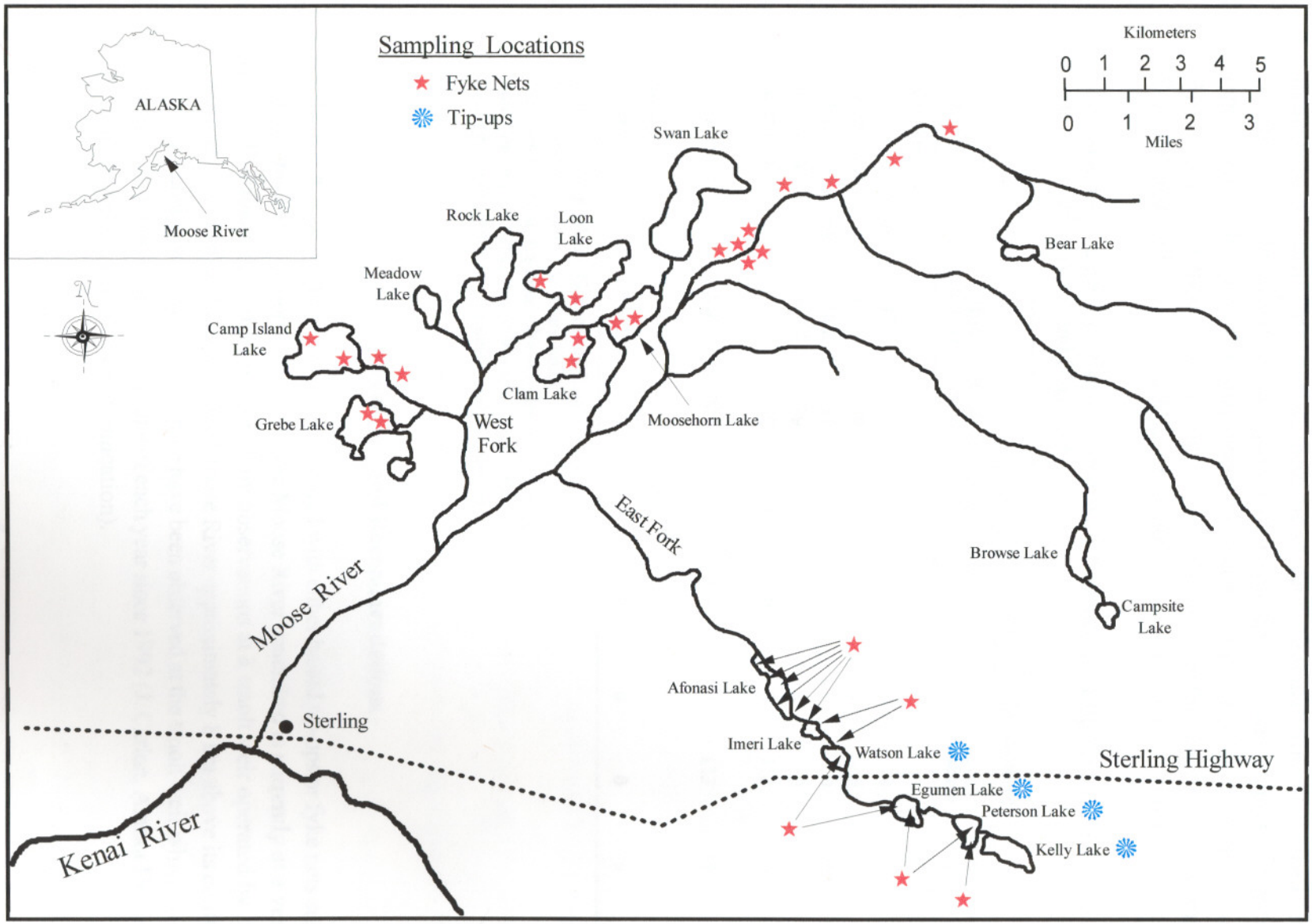

FIGURE 1. – Sampling locations for northern pike in the Moose River drainage during 1996.

longnose sucker were the most numerous species captured. Rainbow trout were captured throughout the watershed, whereas, longnose sucker were found primarily in the East Fork. Juvenile coho salmon and smaller species such as sculpin spp. and lamprey spp. were well represented in the catch of a small-mesh fyke net fished at Watson Lake outlet during late April. Tip-ups baited with herring were fished through the ice on Watson, Egumen, Peterson, and Kelly lakes from 1-12 April, however, no fish were captured.

TABLE 1.—Number of fish captured with fyke nets and tip-ups in the Moose River watershed during April and May 1996.

		Number of fish captured						
Gear/drainage	Effort (hours)	Rainbow trout	Dolly Varden	Longnose sucker	Round whitefish	Coho salmon	Sculpin spp.	Lamprey spp.
Fyke Net								
Moose mainstem	349.6	1	0	0	0	0	0	0
West Fork[1]	444.9	39	19	2	1	0	0	0
Moosehorn Creek[2]	318.8	34	0	1	2	0	0	0
East Fork[3]	961.7	99	1	270	4	0	0	0
East Fork[4]	71.5	50	0	0	0	113	15	18
All locations	2,146.5	223	20	273	7	113	15	18
Tip-ups								
East Fork[5]	1,844.2	0	0	0	0	0	0	0

[1]Includes Camp Island, Grebe, and Loon lakes.
[2]Includes Moosehorn and Clam lakes.
[3]Includes Peterson, Egumen, Watson, Imeri, and Afonasi lakes.
[4]Small mesh fyke net fished at Watson Lake outlet.
[5]Includes Kelly, Peterson, Egumen, and Watson lakes.

Discussion and Recommendations

The fact that no northern pike were captured with either baited tip-ups or fyke nets suggests that the abundance of northern pike in the Moose River watershed is currently at a very low level. This finding is further supported by observations at a smolt weir operated by Alaska Department of Fish and Game on the Moose River approximately 8 km above its confluence with the Kenai River. No northern pike have been observed at the smolt weir which has been operated from mid-May through June of each year since 1992 (J. Carlon, Alaska Department of Fish and Game, personal communication).

Although the abundance of northern pike in the Moose River watershed is currently at a low level, it is likely their abundance will increase in the future. This projected increase in abundance will be supported by favorable habitat conditions and an abundance of prey. Most lakes and streams within the Moose River watershed support extensive beds of submergent aquatic vegetation which provide ideal spawning and rearing habitat for northern pike. The availability of suitable habitat coupled with an abundant food supply of juvenile salmonids and other resident fish species provides ideal conditions for an expansion of the northern pike population in the Moose River watershed.

Options for managing northern pike in the Moose River watershed are limited. Chemical eradication is not feasible because of the physical size of the drainage and negative impacts to non-target species. The current management approach for northern pike on the Kenai Peninsula is to maximize harvest through liberal sport fishing regulations. While this approach is appropriate for the Moose River watershed, it probably will have little utility until northern pike numbers are large enough to attract anglers.

This survey provides the first concentrated effort to assess the status of the northern pike population in the Moose River watershed. While the current level of abundance appears to be low, we anticipate an expansion of the population in the future. We recommend the following activities to monitor the future status of the northern pike population in the Moose River watershed:

1) Periodically (every 2-3 years) sample Watson, Egumen, Peterson, and Kelly lakes with tip-ups and fyke nets during April and May.
2) Continue to monitor for northern pike at the smolt weir operated annually on the Moose River by Alaska Department of Fish and Game.
3) Post signs at Watson, Egumen, Peterson, and Kelly lakes requesting anglers to provide information on sport caught northern pike.
4) Monitor catch and harvest of northern pike for the Moose River and other Kenai Peninsula waters as determined by the Statewide Harvest Survey.

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APPENDIX 1.—Number of fish captured with fyke nets at various locations within the Moose River watershed during April and May 1996.

Stream/lake	Fyke net location		Effort (hours)	Number of fish captured						
	Latitude (N)	Longitude (W)		Rainbow trout	Dolly Varden	Longnose sucker	Round whitefish	Coho salmon	Sculpin spp.	Lamprey spp.
Moose River	60°41.25'	150°25.02'	60.8							
Moose River	60°40.94'	150°26.32'	59.3	1						
Moose River	60°40.56'	150°27.63'	60.5							
Moose River	60°40.38'	150°29.54'	17.0							
Moose River	60°39.55'	150°30.49'	15.0							
Moose River	60°39.40'	150°31.02'	16.5							
Moose River	60°39.62'	150°30.26'	40.0							
Moose River	60°39.19'	150°30.90'	39.5							
Moose River	60°39.35'	150°31.42'	41.0							
West Fork	60°37.89'	150°41.95'	47.0	22	7	2	1			
West Fork	60°37.81'	150°41.71'	46.5	4	3					
Grebe Lake	60°37.19'	150°41.56'	63.5	1	1					
Grebe Lake	60°36.93'	150°41.36'	63.5	7	2					
Camp Island Lake	60°38.34'	150°44.23'	42.8	3	5					
Camp Island Lake	60°37.97'	150°42.63'	42.3	2	1					
Loon Lake	60°38.97'	150°38.29'	70.3							
Loon Lake	60°38.83'	150°36.05'	69.0							
Clam Lake	60°38.47'	150°35.22'	85.0	21						
Clam Lake	60°37.95'	150°35.96'	64.5	2						
Moosehorn Lake	60°38.49'	150°34.93'	84.8	2			1			
Moosehorn Lake	60°38.54'	150°34.87'	84.5	9		1	1			

(Continued)

APPENDIX 1.—Continued.

Stream/Lake	Fyke net location		Effort (hours)	Number of fish captured						
	Latitude (N)	Longitude (W)		Rainbow trout	Dolly Varden	Longnose sucker	Round whitefish	Coho salmon	Sculpin spp.	Lamprey spp.
Peterson Lake	60°31.44'	150°23.55'	71.8	3						
Peterson Lake	60°31.20'	150°23.71'	70.8	3						
Egumen Lake	60°31.66'	150°26.13'	66.8	25		6				
Egumen Lake	60°31.64'	150°25.34'	65.8	1		5				
Watson Lake	60°32.42'	150°27.88'	66.3	4		15	1			
Watson Lake	60°32.53'	150°28.15'	132.0	23	1	141	3			
Watson Lake[1]	60°32.53'	150°28.15'	71.5	50				113	15	18
Imeri Lake	60°32.68'	150°28.55'	70.3	3		8				
Imeri Lake	60°32.76'	150°28.77'	70.5	18		62				
Afonasi Lake	60°33.06'	150°29.38'	70.5	8		5				
Afonasi Lake	60°33.46'	150°29.72'	69.8	3						
Afonasi Lake	60°33.62'	150°30.06'	68.5	3						
Afonasi Lake	60°33.74'	150°30.41'	69.8	1		17				
Afonasi Lake	60°33.51'	150°29.75'	68.8	4		11				
All locations			2146.5	223	20	273	7	113	15	18

[1]Small mesh fyke net fished at Watson Lake outlet from 23-26 April.

APPENDIX 2.— Tip-ups baited with herring were fished in Watson, Egumen, Peterson, and Kelly lakes during the late winter ice-covered period.

APPENDIX 3.— Fyke nets were fished in shallow littoral areas of lakes, lake outlets, and low-gradient sections of streams througout the Moose River watershed.

APPENDIX 4.— Most lakes and streams in the Moose River watershed support large beds of submergent aquatic vegetation creating both ideal spawning and rearing habitat for northern pike.